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Application No.: 10/055,157

Docket No.: JCLA4827-CIP

REMARKS

Present Status of the Application

The Office Action objected the drawings and the amendments filed on January 10, 2003

for adding new matters. The Office Action rejected claims 1-20 under 35 U.S.C.112, 1st

paragraph, as containing subject matter which was not described in the specification in such a

way as to reasonably convey to one skilled in the art that the inventor has possession of the

claimed invention. Claims 1-3, 5 and 6 were rejected under 35 U.S.C. 103(a), as being

unpatentable over Walsh et al. (US Patent No. 6,228,741). Claims 8-10, 12-16 and 18-20 were

rejected under 35 U.S.C. 103(a), as being unpatentable over Walsh in view of Kuehne et al. (US

Patent No. 6,146,975). Claims 4 and 7 were rejected under 35 U.S.C. 103(a) as being

unpatentable over Walsh and in view of Breiten et al. (US Patent No. 4,836,885). Claims 11 and

17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Walsh in view of Kuehne

and further in view of Breiten.

Claims 1, 8, 14 and 20 have been amended, while the specification and drawings have

been amended, for canceling the new matters as suggested by the Office Action and for

clarification purposes. This Amendment is promptly filed to place the above-captioned case in

condition for allowance. No new matter has been added to the application by the amendments

made to the claims, specification or otherwise in the application. After entering the amendments

and considering the following remarks, a notice of allowance is respectfully solicited.

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For The Drawings

The Office Action objected the drawings filed on January 10, 2003 for adding new

matters. The Office Action pointed out that the thin film 150 should be discontinuous and almost

no thin film 150 was formed on the sidewalls 145.

Figures 1B to 1D are amended and enclosed. Submitted for the Examiner's approval are

proposed drawing changes, with the corrections indicated in red ink and revised formal drawings

will be submitted in compliance with U.S. Patent and Trademark Office Guidelines, upon

allowance of the present application. Applicant believes this amendment of the drawings has

cancelled the new matters. Reconsideration and withdrawal of this objection is respectfully

requested.

Discussion of 112 rejections

Claims 1-20 were rejected under 35 U.S.C. 112, 1st paragraph, as containing subject

matter which was not described in the specification in such a way as to reasonably convey to one

skilled in the art that the inventor has possession of the claimed invention.

Applicant has amended the specification and claims 1, 8, 14 and 20, as suggested by the

Office Action. Applicant believes this amendment of the drawings has cancelled the new matters.

Accordingly, the claims have been amended to recite "while the thin film above the trench

protects the insulation layer in the trench", while the specification has been amended to delete the

term "substantially".

Reconsideration and withdrawal of this objection is respectfully requested.

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Discussion of 103 Rejections

Claims 1-3, 5 and 6 were rejected under 35 U.S.C. 103(a), as being unpatentable over

Walsh et al. (US Patent No. 6,228,741). Claims 8-10, 12-16 and 18-20 were rejected under 35

U.S.C. 103(a), as being unpatentable over Walsh in view of Kuehne et al. (US Patent No.

6,146,975). Claims 4 and 7 were rejected under 35 U.S.C. 103(a) as being unpatentable over

Walsh and in view of Breiten et al. (US Patent No. 4,836,885). Claims 11 and 17 were rejected

under 35 U.S.C. 103(a) as being unpatentable over Walsh in view of Kuehne and further in view

of Breiten.

Applicants respectfully traverse the rejections for at least the reasons set forth below.

The independent claims 1, 8 and 14 have been amended to more clearly define the

method according to the present invention. No new matter has been added to the amendment of

the claims. Supporting grounds can be found in page 6, lines 19-20 and page 6, lines 23-24 of

the specification. From Fig. 1D, it clearly shows that the thin film 150 above the trenches are

not removed because of the protection of the screen layer 160b above the trenches, while the thin

film 150 on the insulation layer 140 above the active areas is removed along with the screen layer

160a. That is, the screen layer 160a and the thin film 150 above the active areas are removed at

the same time, in the present invention.

Applicant respectfully asserts that the method claimed in the present invention patentably

distinguishes over Walsh's or Kuehne's method, because the references at least lack these

features discussed in the followings.

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Walsh discloses depositing HDP oxide 40 to fill the trench 25 and on the nitride 30 and

followed by in-situ sputtering etch (Step 150) to make sure the edges of the nitride 30 being

exposed. Next, a conformal nitride cap layer 50 is formed along the profile of the HDP oxide 40

(covering the trench and the active areas). A patterned photoresist 60 is formed above the trench

as a mask for patterning and etching the conformal nitride cap layer 50, to remove the nitride cap

layer 50 over the active areas. After the nitride cap layer 50 over the active areas is removed, the

patterned photoresist 60 is then removed, as shown in Fig. 7. The HDP oxide 40 is removed with

the patterned cap nitride layer 50 as a mask.

In fact, Walsh merely discloses patterning and etching the cap nitride layer 50 using

various methods. However, the Office Action alleged that the patterned photoresist 60 used in

the lithography step for patterning and etching the cap nitride layer 50 is comparable to the screen

layer of the present invention. Even taking the above allegation into consideration, Walsh

obviously teaches removing a portion of photoresist over the active areas (for forming patterned

photoresist 60 over the trench) before removing the cap nitride layer 50 over the active areas.

Clearly, Walsh fails to teach or suggest "removing the screen layer and the thin film over

the active region at the same time, while the screen layer and the thin film above the trenches

are not removed" as claimed in the present invention. Hence, Walsh fails to disclose all the

features, as recited in independent claims 1, 8 and 14.

Although Kuehne discloses forming a pad oxide layer 22 and a silicon nitride polishing

stop layer 23 covering the substrate 21, Kuehne fails to teach or suggest removing the screen

layer and the thin film over the active region at the same time, while the screen layer and the thin

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film above the trenches are not removed. Therefore, Kuehne did not remedy deficiencies of

Walsh. In fact, Kuehne discloses a CMP process for STI technology involving dual polishing

stop layers, which is contradictory to the objectives of the present invention.

As discussed above, both Walsh and Kuehne lack these features emphasized above.

Moreover, Kuehne teaches away by disclosing the CMP process for STI.

As noted in the Office Action, Breiten discloses forming a pad oxide layer 13 and a

variety materials being used for the second layer 25. Breiten fails to teach or suggest the features

emphasized above and does not remedy deficiencies of Walsh or Keuhne.

In contrary, in the present invention, the thin film and the screen layer have uneven

thickness above the trenches or the active areas. The screen layer above the active areas and the

thin film above the active areas are removed at the same time. The remaining screen layer

protects the underlying thin film above the trenches. In the present invention, no CMP is

required to form shallow trench isolations, thus preventing scratches or defects formed on the

surface of the active areas and the STI.

Thus, even if combined, the combination of the cited references fails to arrive at the present

invention as recited in independent claims 1, 8 and 14. For at least the same reasons, dependent

claims are submitted to patently define over the cited references. Reconsideration and

withdrawal of the rejection are respectfully requested.

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CONCLUSION

For at least the foregoing reasons, it is believed that all pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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